

REMARKS

In the Office Action mailed October 24, 2002, claims 6, 11-23, 31-37, 43-48 and 69-70 were withdrawn from consideration as being drawn to a nonelected invention. Claims 1-6, 8, 10, 24-27, 29-30, 38-42, 49-58 and 63-68 were rejected under 35 U.S.C. 112, first paragraph. Claims 1-6, 38-42, 49-57 and 63-68 were rejected under 35 U.S.C. 112, second paragraph. Claims 1-6, 8-10, 24-30, 38-39 and 51-63 were rejected under 35 U.S.C. 102(b). Claims 56-69 and 62 were rejected under 35 U.S.C. 102(b). Claims 1, 4-6, 8-10, 24-30, 38-39, 41-42 and 56-63 were rejected under 35 U.S.C. 102(b). Claims 2-3 and 49-50 were rejected under 35 U.S.C. 103(a).

Election

✓ In the Office Action mailed October 24, 2002, the summary page indicates claims 7, 11-23, 31-37, 43-48 and 69-70 were withdrawn from consideration as being drawn to a nonelected invention. Page 2 of the Office Action mailed October 24, 2002 indicates claims 6, 11-23, 31-37, 43-48 and 69-70 were withdrawn from consideration as being drawn to a nonelected invention. It is assumed claim 6 is included with the elected invention and claim 7 is withdrawn from consideration as being drawn to a nonelected invention. → It is believed claims 12-23 should be included with the elected invention. Claims 12-23 are directed to the liquid crystal composition of claim 1 (included with the elected invention), further comprising one or more additional components. In addition, it is believed claims 69-70 should be included with the elected invention. Claims 69 and 70 are directed to a method of making a liquid crystal composition which comprises combining one or more chiral nonracemic compounds of claim 1 with one or more additional compounds. Reconsideration and rejoinder of claims 12-23 and 69-70 is respectfully requested.

35 U.S.C. 112, first paragraph rejections

In the Office Action mailed October 24, 2002, claims 1-6, 8, 10, 24-27, 29-30, 38-42, 49-58 and 63-68 were rejected under 35 U.S.C. 112, first paragraph. The Office Action stated the specification was enabling for 1-20 carbon atoms in side groups R and R¹, but did not reasonably provide enablement for more than 20 carbon atoms. While

Applicant does not concede, to advance prosecution, independent claims 1 and 56 have been amended to specify that side groups R and R¹ contain from 1 to 20 carbon atoms. This amendment is supported by the specification as filed on page 10, line 1 through page 11, line 21. This amendment is believed to overcome the rejection. Reconsideration and withdrawal of the rejection is respectfully requested.

35 U.S.C. 112, second paragraph rejections

In the Office Action mailed October 24, 2002, claims 1-6, 38-42, 49-57 and 63-68 were rejected under 35 U.S.C. 112, second paragraph. In claims 1 and 56, the R group was said to be not clearly defined when R is an ether because the side group is already an ether or alkoxy group (O-R). If R is an ether group, then the side group would be a peroxide R-O-O- group. In response, independent claims 1 and 56 have been amended to clarify the R tail group. R is now defined as C_nF_{2n+1}C_mH_{2m} where m is greater than 3 and m + n is less than or equal to 20 wherein R is optionally attached to ring A with an oxygen. This amendment is supported by the specification as filed, for example page 10, lines 1 through 7. This amendment is believed to overcome the rejection.

In claim 40, the PDMS group was said to be not defined. In response, claim 40 has been amended to replace the abbreviation "PDMS" with the structure represented by the abbreviation. This amendment is supported by the specification as filed, on page 63, final row. This amendment is believed to overcome the rejection.

Reconsideration and withdrawal of the 35 U.S.C. 112 rejections is respectfully requested.

35 U.S.C. 102(b) rejections

In the Office Action mailed October 24, 2002, claims 1-6, 8-10, 24-30, 38-39 and 51-63 were rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al. (US 5,110,497). The Office Action stated "the reference discloses an optically active compound represented by formula (I) and a liquid crystal composition containing at least one of the reference optically active compounds. The compound is useful not only as a

liquid crystal compound but as a chiral dopant to provide a liquid crystal composition exhibiting a chiral smectic phase. The compounds of Examples 1-2 and claims 1-3 of the reference anticipate the claimed compound. The Example 3 anticipates the claimed composition and its liquid crystal properties.”

In response, claims 1 and 56 have been amended to clarify the R tail group. The Suzuki reference does not disclose or suggest any compounds wherein the tail group represented by R in the present invention has an alkyl linker greater than 3 carbon atoms (see claims 1-3). In addition, the discussion in Suzuki of the variable corresponding to R in the current invention (column 4, lines 28-41) does not anticipate the definition of R in the current claims. This amendment is believed to overcome the rejection.

In the Office Action mailed October 24, 2002, claims 56-69 and 62 were rejected under 35 U.S.C. 102(b) as being anticipated by CAPLUS 1998: 624749. The Office Action stated “the reference discloses a novel compound represented by RN 215929-80-9, which anticipates the claimed compound.” The amendment of claim 56 described above is believed to overcome this rejection. CAPLUS 1998: 624749 does not disclose or suggest any compounds wherein the tail group represented by R in the present invention contains m greater than 3, as required by the present claims.

In the Office Action mailed October 24, 2002, claims 1, 4-6, 8-10, 24-30, 38-39, 41-42 and 56-63 were rejected under 35 U.S.C. 102(b) as anticipated by JP 8-113784. The Office Action states “the reference discloses a novel compound represented by formula (I) and liquid crystal composition containing the compound, which anticipate the claimed invention (see formula (I) on page 1 and table 1 on page 4 and the liquid crystal composition is shown on page 6).” In response, claims 1 and 56 have been amended to clarify that n is not an integer from 4 to 14 and m is not an integer from 4 to 13 when Y is CH₃ or CF₃ and R¹ is an unsubstituted straight chain alkyl group with from 2 to 12 carbon atoms and D is -COO- and A, B and C are unsubstituted 6-carbon aromatic rings. These amendments are supported by the specification on page 16, for example. It is believed these restrictions overcome the rejection.

Reconsideration and withdrawal of the 35 U.S.C. 102(b) rejections is respectfully requested.

35 U.S.C. 103(a)

In the Office Action mailed October 24, 2002, claims 2-3 and 49-50 were rejected under 35 U.S.C. 103(a) over Suzuki et al. (US 5,110,497). The Office Action states:

The reference teaching has been previously set forth in section 6 above. The present invention differs from the claims in that the claims have specific liquid crystal properties such as V-shape switching and high polarization ($P_s > 27$ or 40). The reference did suggest the performance properties including high spontaneous polarization of the liquid crystal materials to improve a high response rate (see col. 1, lines 46-58 and col. 2, lines 38-51). Because the properties of the reference compound (formula I) and suggestion of high spontaneous polarization to improve the response rate, it would have been obvious to those skilled in the art to utilize and optimize the components of the reference compounds to obtain the claimed composition and display device having satisfactory characteristics such as the claimed invention.

In response, it is noted the Suzuki reference does not disclose or suggest any properties except rate of response when a voltage was applied to a cell containing two components (column 11 and 12). There is no disclosure or suggestion of V-shaped switching or high polarization in the Suzuki reference. In addition, a prima facie case of obviousness has not been made in this case. First, there is no suggestion or motivation to modify the reference to obtain the present invention. The Suzuki reference contains no suggestion nor motivation to use a tail group represented by R in the present invention wherein m is greater than 3. Therefore, one of ordinary skill in the art would not be motivated to use these tail groups which are required in the present invention from the teachings of Suzuki.

Second, there is no reasonable expectation of success in any modification of Suzuki. Only two compounds have been made in Suzuki. These compounds have m equal to 2 and m equal to 1. These short alkyl linkage groups in Suzuki are commercially available. There is no guidance provided in Suzuki regarding preparing longer alkyl linkage groups. The longer alkyl linkage groups of the present invention (m greater than 3) need to be synthesized using the teachings of the present specification.

Third, Suzuki does not teach or suggest all claim limitations. As discussed above, Suzuki does not disclose the tail groups required in the present invention.

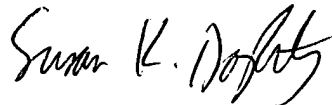
In view of the above, it is believed the claims of the present invention are not obvious over the teachings of the Suzuki reference. Reconsideration and withdrawal of the rejections is respectfully requested.

CONCLUSION

In view of the above arguments and amendments, it is believed all rejections are overcome. Reconsideration and allowance of claims 1-6, 8-10, 12-30, 38-42 and 49-70 is respectfully requested.

This Response is accompanied by corrected drawings as required by the Draftsperson's Drawing Review attached to the Office Action. This Response to Office Action is accompanied by a Request for a Two Month Extension of Time in order that the accompanying submission is timely filed. A check in the amount of \$410.00 is also enclosed for the requisite fee. If this amount is incorrect, however, please charge any fee due, including any extensions of time required, or credit any overpayment to Deposit Account No. 07-1969.

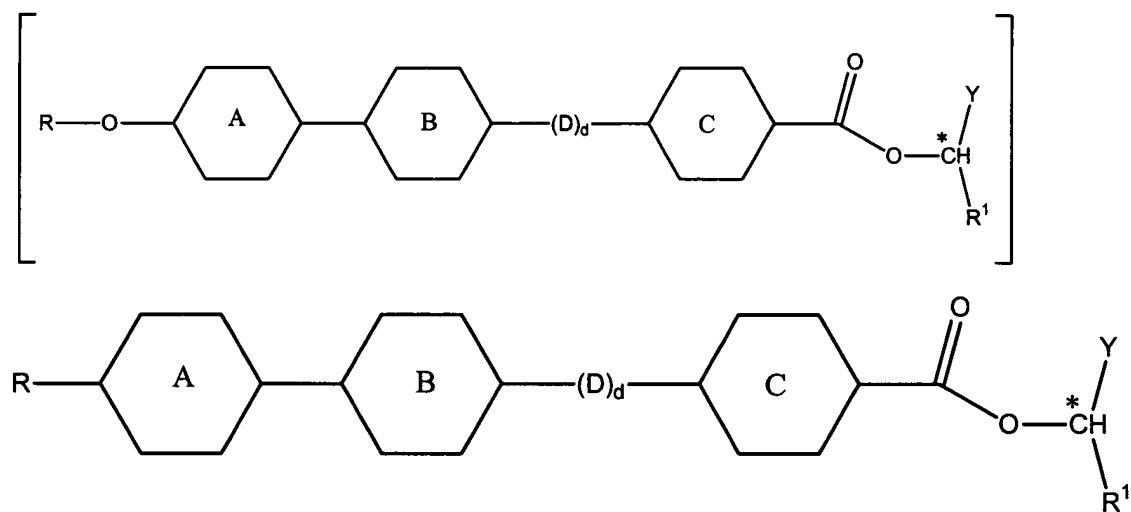
Respectfully submitted,

A handwritten signature in black ink, appearing to read "Susan K. Doughty". The signature is fluid and cursive, with the first name "Susan" and last name "Doughty" clearly distinguishable.

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- (once amended) A liquid crystal composition which comprises one or more compounds of the formula:



wherein:

R is $C_nF_{2n+1}C_mH_{2m}$ where m is greater than 3 and m + n is less than or equal to 20 [a linear or branched perfluorinated or partially fluorinated alkyl group (R^F), a linear, cyclic or branched perfluorinated or partially fluorinated ether group or a linear or branched ether group] and wherein R is optionally attached to ring A with an oxygen;

Rings A, B and C are 5- or 6-carbon aromatic rings each optionally substituted with from one to four fluorines and wherein one or two CH groups in the rings can be substituted with a N, an O or a S group;

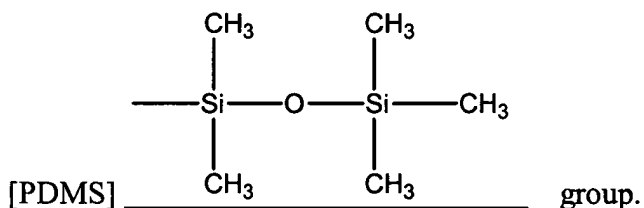
d is 0 or 1;

D is a linker group selected from the group consisting of $-COO-$, $-OOC-$, $-CH_2-CH_2-$, a cis or trans double bond, or a triple bond, when d is 0 rings B and C are linked through a single bond;

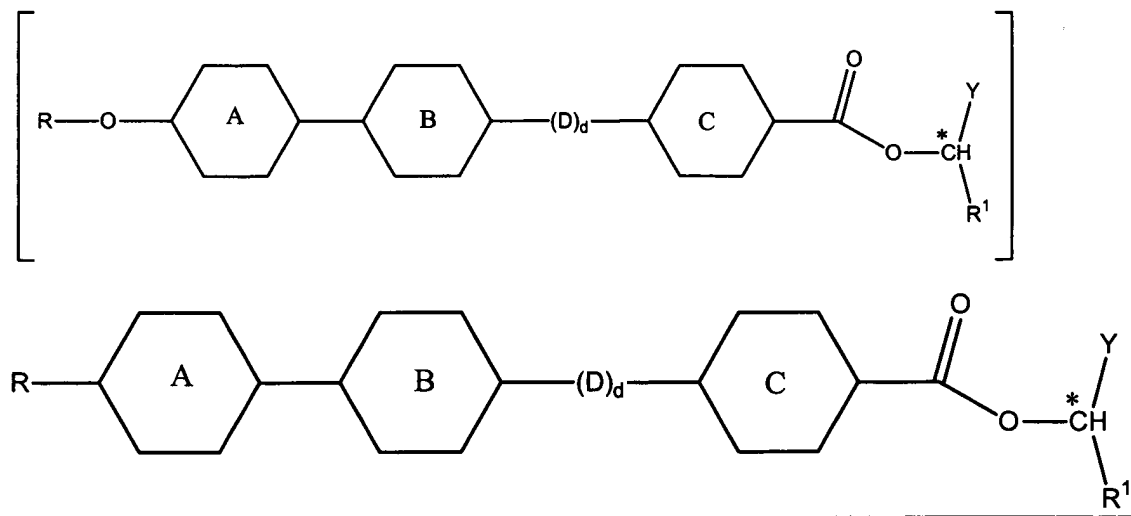
Y is an alkyl or fluorinated alkyl group having from one to six carbon atoms; and

R^1 is a nonchiral tail group selected from linear or branched alkyl groups where one or more non-neighboring CH_2 groups can be replaced with an -O-, -S-, $-Si(R')_2-$, $-Si(R')_2-(CH_2)_p-Si(R')_2-$, where p is an integer ranging from 1 to 6, $-Si(R')_2-O-$, $-Si(R')_2-O-Si(R')_2-O-$, a cis or trans double bond or a triple bond, wherein each R' , independent of other R' , is an alkyl or fluorinated alkyl group having from one to six carbon atoms and wherein the R^1 tail group is optionally substituted with one or more fluorines and wherein R^1 contains from 1 to 20 carbon atoms; provided that n is not an integer from 4 to 14 and m is not an integer from 4 to 13 when Y is CH_3 or CF_3 and R^1 is an unsubstituted straight chain alkyl group with from 2 to 12 carbon atoms and D is $-COO-$ and A, B and C are unsubstituted 6-carbon aromatic rings.

40. (once amended) The liquid crystal composition of claim 38 wherein R^1 contains a



56. (once amended) A compound having the formula:



wherein:

R is $C_nF_{2n+1}C_mH_{2m}$ where m is greater than 3 and m + n is less than or equal to 20 [a linear or branched perfluorinated or partially fluorinated alkyl group (R^F), a linear, cyclic or branched perfluorinated or partially fluorinated ether group or a linear or branched ether group] and wherein R is optionally attached to ring A with an oxygen;

Rings A, B and C are 5- or 6-carbon aromatic rings each optionally substituted with from one to four fluorines and wherein one or two CH groups in the rings can be substituted with a N, an O or a S group;

d is 0 or 1;

D is a linker group selected from the group consisting of -COO-, -OOC-, a cis or trans double bond, or a triple bond, when d is 0 rings B and C are linked through a single bond;

Y is an alkyl or fluorinated alkyl group having from one to six carbon atoms; and

R^1 is a nonchiral tail group selected from linear or branched alkyl groups where one or more non-neighboring CH_2 groups can be replaced with an -O-, -S-, $-Si(R')_2-$, $-Si(R')_2-(CH_2)_p-Si(R')_2-$, where p is an integer ranging from 1 to 6, $-Si(R')_2-O-$, $-Si(R')_2-O-Si(R')_2-O-$, a cis or trans double bond or a triple bond, wherein each R' , independent of other R' , is an alkyl or fluorinated alkyl group having from one to six carbon atoms and wherein the R^1 tail group is optionally substituted with one or more fluorines and wherein R^1 contains from 1 to 20 carbon atoms; provided that n is not an integer from 4 to 14 and m is not an integer from 4 to 13 when Y is CH_3 or CF_3 and R^1 is an unsubstituted straight chain alkyl group with from 2 to 12 carbon atoms and D is -COO- and A, B and C are unsubstituted 6-carbon aromatic rings.